

Spring 1966

Sidney F. Giffin

On 1 August last year the Institute for Defense Analyses (IDA) welcomed to its premises at 400 Army-Navy Drive in Arlington, Virginia, 30 students in an experimental program of education. The students were assigned on orders by the military Services, although the Department of State and the CIA were also represented by one student each, and were for the most part uniformed officers. They were assigned to the Defense Systems Analysis Education Program (short title, Defense Education Program), to be conducted by IDA in cooperation with the University of Maryland.

OSD Declassification/Release Instructions on File

Background for the Program. The program on which these mature and professional students were about to embark was instigated primarily by Dr. Alain Enthoven, then Deputy Assistant Secretary of Defense (Comptroller) and now Assistant Secretary of Defense (Systems Analysis). Dr. Enthoven was convinced that aspects of the methods of management and analysis introduced to the Pentagon under the present Secretary of Defense could and should become equipment possessed by career officers of the Department of Defense, military and civilian.

Discussion of this notion within the Department of Defense led to the outline of an academic curriculum which, it was thought, might achieve the desired educational result. The search then began for an institution qualified to offer a program of education based upon the proposed curriculum, but also based upon reasonably free access to classified Defense material which it was thought would be required for purposes of the program.

The nature of the curriculum, involving as it did the development of new courses and a mix of disciplines as well as the problem of access to classified information, led the Department of Defense to conclude that IDA would be a suitable agency to conduct the program. With, it must be admitted, some reservations, IDA last Spring accepted responsibility for the program, to include the responsibility of negotiating with a university for the accreditation of academic work to be completed in connection with the program.

Prior to assuming this commitment, it had already been determined that the University of Maryland

was interested in collaborating on the program. Dr. Elliott Montroll, Vice President for Research of IDA, who had a Maryland affiliation, discussed the matter with Professor Dudley Dillard, Head of the Economics Department of the University, with the result that the University became interested in developing an economics doctoral program in the field of systems analysis. It was agreed that IDA would assist the University toward this goal, while the University, on its part, would provide a masters degree to which students in the program could aspire.

The Current Program. The current program was designed to take care of 30 students, as indicated above, but has also included a few IDA staff people on a course-by-course basis. A small administrative office, consisting of a Program Director, an administrative assistant and a secretary, was established; cubicles were equipped to accommodate two students each; a small commons room was provided; a program library was established; and a single large classroom was made available. Control of the program was vested in a committee composed of Dr. Montroll, Professor Dillard, Dr. William A. Niskanen, Director of the Economic and Political Studies Division of IDA, and the writer as Program Director.

Criteria for the selection of students demanded a baccalaureate degree with good grades, and mathematics through calculus. Inasmuch as the Services chose to select students in middle grades, with an average age of 39, it had to be expected that few would have completed much academic work in the field of economics, and this did prove

to be the case. The reason for this is that economics has only in recent years demanded proficiency in mathematics, and a college graduate 39 years old would almost have had to be in engineering school to meet the math requirement. This consideration made it evident that undergraduate courses in economics should be supplied at the outset, and it was also obvious that most students would need to be brought "back to speed" in math. The first of three 16-week semesters plus one 6-week semester, therefore, offered three undergraduate courses: Intermediate Macroeconomics (Econ. 102 at Maryland), Intermediate Microeconomics (Econ. 132), and Intermediate Mathematical Analysis (Econ. 130). The opening semester also offered the first course of a triple sequence in Defense Policy, the sequence having been developed for purposes of the program. Defense Policy I (G. & P. 203) was designed to cover the political and strategic context in which U.S. defense decisions must be made. All courses were taught by members of the IDA staff.

The second semester also involves four courses: Advanced Microeconomics I (Econ. 200); Probability and Statistics (Econ. 212); Operations Research I (B.A. 167); and Defense Policy II (Physics 150), which covers technological factors bearing on defense policy. All courses, in progress as this is written, are being taught by IDA staff people.

The final semester at IDA, commencing on 30 March, will include: Advanced Microeconomics II (Econ. 201); Econometrics (Econ. 217); Defense Policy III (Econ. 243), which will provide an economic analysis of defense policy; and the beginning of a thesis program. The courses will be taught by IDA staff people, which thesis advisement will be divided among IDA and Maryland faculty people. Final advisement and thesis acceptance will of course lie with the University.

The program will be completed with an additional 6 weeks of work on the Maryland campus at College Park. (Thesis completion, for degree purposes, will in most cases be an individual problem.) One of the courses to be given at

College Park will be Advanced Macroeconomics (Econ. 202), while the other will be a selected course in economics at undergraduate or intermediate level, necessary in the case of nearly every student to remove a provision in acceptance to the graduate school in economics. This provision relates to the fact that students generally, as indicated above, had only meager backgrounds in economics on entering the program. The short term at College Park is also designed in part to satisfy "on campus" requirements of the University in connection with advanced degrees.

Forthcoming Programs. For the academic year 1966-67, arrangements are in hand to accommodate 50-60 students in two sections, one of which is likely to become an advanced section in most subjects as the year goes on. With the object of accomplishing an improved pooling of IDA/Maryland instructional talent, the University will be responsible for more instruction next year than has been the case in the pilot program.

The program will be conducted in three terms, beginning with attendance at the regular College Park summer session of the University, during which the undergraduate courses of the first term this year at IDA will be repeated. The Fall term (at IDA) will cover five courses: Econ. 200, Econ. 212, G. & P. 203, B. A. 167, and Physics 150. The Spring term, designed to end about 1 May, will cover four courses plus the beginning of thesis work: Econ. 201, Econ. 217, Econ. 243, and Econ. 202. There will be a total of 39 credit hours for the 3 terms, 9 of which will be at the undergraduate level and 3 of which will be for thesis work. The plan is to devote the period from 1 May to 15 June exclusively to thesis completion (for 3 added credit hours) at the University, thus making it possible for students unprovisionally accepted for graduate work to acquire a master's degree within the program year.

Those who require undergraduate credits in economics, for "make-up" purposes, will have to pursue appropriate courses as the opportunity presents subsequent to the program.

It should be noted that several of the forthcoming courses to be presented at the IDA premises will have, as instructors, Maryland faculty members. Moreover, at least one course during the Spring term (Econ. 202) will probably involve travel to College Park on the part of the students.

Programs subsequent to that of 1966-67 -- and the presumption is that there will be such programs -- will probably involve an increase in participation by the University of Maryland and a consequent decrease in the IDA involvement. This would be consistent with the notion that the University should move toward a doctoral program (economics) in the field of systems analysis.

Systems Analysis as a Military Field. "Systems analysis" is another way of saying "cost effectiveness," which is the analysis of alternatives to produce the best choice for the money or the least cost for the choice. Since it deals with futures, it does not rely upon operational information or data as does operations research. One might say that the relation of systems analysis to operations research is that of strategy to tactics. The comparison is not an invidious one: wars can be lost through bad tactics as well as through bad strategy, and in fact bad tactics can invalidate the most brilliant of strategies.

Dr. Enthoven has said that "the Office of the Secretary of Defense is trying to encourage, stimulate, and contribute to the development of a new analytical approach or discipline for synthesizing many of the factors that go into defense planning." This of course is what the IDA/Maryland experiment is trying to accomplish, for it is a means to the OSD end. Why is a new approach indicated? Dr. Enthoven's words again are useful: "the problems of selecting strategies and choosing weapon systems today are quite unlike anything that existed before the Second World War . . . something new has been happening in the past 20 years. Science and technology have gone through a 'take-off' and they are now in a period of rapid, accelerating and apparently self-sustaining growth. . . Before World War II, we did not plan on technological change, we merely adjusted to it. Now we are planning on it. We are debating

whether weapons can be scheduled, and we have weapon systems that are being called obsolescent while still in production. But . . . we have not escaped the ancient necessity for choice arising out of the scarcity of available resources."*

Obviously, if new methods of cost effectiveness analysis are to survive periodic changes in political appointees to the Pentagon, career officers must learn the methods. This is evidently the reason that OSD wants to see the development of a systems analysis discipline or approach. But there is even a better reason for careerists, particularly military careerists, to learn the business -- they may otherwise be unable to participate in important phases of defense decision-making.

All of the military services have a current need for systems analysts, and there will be numerous possible assignments open to graduates of the Defense Education Program. However, only the Army thus far seems to have established a distinct career field for systems analysis. This was accomplished on 15 November 1965 in Operating Instructions NR 614-100(7), which describes systems analysis as "the disciplined application of analytical tools and techniques to the study and design of weapons systems, strategy, force levels, and operational concepts. It involves decision-making in problems concerning allocation of military resources, formulation of objectives, model specification, cost estimation, and success criteria choice . . . The term SYSTEMS ANALYSIS generally includes broader and more difficult problems than those traditionally covered by the terms OPERATIONS ANALYSIS and OPERATIONS RESEARCH. The latter terms are often applied to studies of existing systems, or to some facets of a single system, designed to uncover more effective ways to perform specific missions. Systems analysis, on the other hand, refers to the far more complex problem of choice among alternative future systems, where the degrees of freedom and the uncertainties are large, where the difficulty lies as much in deciding what ought to be done as

*Excerpts are from an article in United States Naval Institute Proceedings, January 1964, p. 151-8.

in how to do it. . . . The total analysis is a complex and untidy procedure, with no possibility of quantitative optimization over the whole problem" The Army identifies almost 200 slots for systems analysts in the Washington area.

The Air Force, in Air Force Manual No. 300-4, Vol. 2, Part II, page 22, defines systems analysis, although it has as yet established no specific career field: "A study of the process in which costs and risks of alternative patterns of resource allocation are systematically examined and balanced against expected benefits with the end objective of improving the quality of decision-making." At the present time there are requirements for more than 100 systems analysts on the Air Staff alone.

.....

The Navy has the present intention of using its "operations analysis" specialty codes to cover "systems analysis" as well, and the descriptions employed appear capable of being stretched for this purpose. The Navy, like the Army, identifies nearly 200 system analyst positions in the Washington area.

The Defense Education Program of IDA and Maryland is expected to prove an important source in filling system analyst positions both in Washington and within major commands elsewhere. The program by itself, however, can scarcely produce finished systems analysts. The hope is that graduates of the program will acquire the necessary tools so that, with practice and experience, they will be able to develop along professional lines.